LESSON 1.3 CONTINUED

NAME ______________________ DATE __________

Practice with Examples

For use with pages 16–22

EXAMPLE 2 Evaluating Expressions With Grouping Symbols

Evaluate $24 \div (6 \cdot 2)$.

SOLUTION

$24 \div (6 \cdot 2) = 24 \div 12$	Simplify $6 \cdot 2$.
$= 2$	Evaluate the quotient.

Exercises for Example 2

Evaluate the expression.

4. $(6 - 2)^2 - 1$

5. $30 \div (1 + 4) + 2$

6. $(8 + 4) \div (1 + 2) + 1$

7. $6 - (2^2 - 1)$

8. $(30 \div 1) + (4 + 2)$

9. $8 + 4 \div (1 + 2 + 1)$

Chapter 1

LESSON 2.6 CONTINUED

NAME ______________________ DATE __________

Practice with Examples

For use with pages 100–107

EXAMPLE 3 Using the Distributive Property to Combine Like Terms

a. $7 - 3(2 + z) = 7 + (-3)(2 + z)$ Rewrite as an addition expression.

$= 7 + [(-3)(2) + (-3)(z)]$ Distribute the -3.

$= 7 + (-6) + (-3z)$ Multiply.

$= 1 - 3z$ Combine like terms and simplify.

b. $4x(5 - x) - 2x = 4x[5 + (-x)] - 2x$ Rewrite as an addition expression.

$= (4x)(5) + (4x)(-x) - 2x$ Distribute the $4x$.

$= 20x - 4x^2 - 2x$ Multiply.

$= 20x - 2x - 4x^2$ Group like terms.

$= 18x - 4x^2$ Combine like terms and simplify.

Exercises for Example 3

Apply the distributive property. Then simplify by combining like terms.

13. $(2w + 4)(-3) + w$

14. $3(5 - q) - q$

15. $-9t(t - 4) - 12$

16. $x^2 - 2x(x + 7)$

17. $-(6y - 5) + 6y$

18. $15d^2 + (2 - d)4d$

Chapter 2

LESSON 2.7

NAME ______________________ DATE __________

Practice with Examples

For use with pages 108–113

GOAL Divide real numbers and use division to simplify algebraic expressions

VOCABULARY

The product of a number and its **reciprocal** is 1.

EXAMPLE 1 *Dividing Real Numbers*

Find the quotient.

a. $-30 \div 10$ **b.** $-24 \div (-6)$ **c.** $5 \div \left(-\frac{1}{3}\right)$

SOLUTION

a. $-30 \div 10 \quad = -30 \cdot \frac{1}{10} = -3$

b. $-24 \div (-6) \quad = -24 \cdot \left(-\frac{1}{6}\right) = 4$

c. $5 \div \left(-\frac{1}{3}\right) \quad = 5(-3) = -15$

Exercises for Example 1

Find the quotient.

1. $36 \div (-3)$

2. $-28 \div (-7)$

3. $-13 \div 26$

4. $4 \div \left(-\frac{1}{2}\right)$

5. $-\frac{1}{3} \div (-5)$

6. $-25 \div 5$

Chapter 2

NAME ______________________ DATE __________

Practice with Examples

For use with pages 108–113

EXAMPLE 2 Using the Distributive Property to Simplify

Simplify the expression $\frac{48x + 6}{6}$.

SOLUTION

$\frac{48x + 6}{6}$	$= (48x + 6) \div 6$	Rewrite fraction as division expression.
	$= (48x + 6)\left(\frac{1}{6}\right)$	Multiply by reciprocal.
	$= (48x)\left(\frac{1}{6}\right) + 6\left(\frac{1}{6}\right)$	Use distributive property.
	$= 8x + 1$	Simplify.

Exercises for Example 2

Simplify the expression.

7. $\frac{-35 + 14y}{7}$

8. $\frac{28 - 7x}{-14}$

9. $\frac{18a + 30}{-3}$

NAME ______________________ DATE __________

Practice with Examples

For use with pages 166–172

EXAMPLE 2 Changing Decimal Coefficients to Integers

Multiply the equation by a power of 10 to write an equivalent equation with integer coefficients. Solve the equivalent equation and round to the nearest hundredth.

$3.11x - 17.64 = 2.02x - 5.89$

SOLUTION

$3.11x - 17.64 = 2.02x - 5.89$	Write original equation.
$311x - 1764 = 202x - 589$	Multiply each side by 100.
$109x - 1764 = -589$	Subtract $202x$ from each side.
$109x = 1175$	Add 1764 to each side.
$x = \frac{1175}{109}$	Divide each side by 109.
$x = 10.77981\ldots$	Use a calculator.
$x \approx 10.78$	Round to nearest hundredth.

The solution is approximately 10.78. Check this in the original equation.

Exercises for Example 2

Multiply the equation by a power of 10 to write an equivalent equation with integer coefficients. Then solve the equivalent equation and round to the nearest hundredth.

5. $5.8 + 3.2x = 3.4x - 16.7$

6. $-0.83y + 0.17 = 0.72y$

LESSON 4.2

NAME ______________________ DATE ________

Practice with Examples

For use with pages 210–217

GOAL **Graph a linear equation using a table or a list of values and graph horizontal and vertical lines**

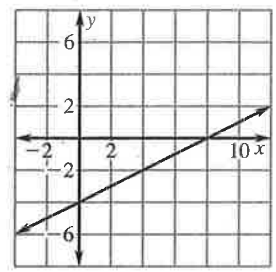
VOCABULARY

A **solution of an equation** in two variables x and y is an ordered pair (x, y) that makes the equation true.

The **graph of an equation** in x and y is the set of all points (x, y) that are solutions of the equation.

EXAMPLE 1 *Verifying Solutions of an Equation*

Use algebra to decide whether the point (10, 1) lies on the graph of $x - 2y = 8$.



SOLUTION

The point (10, 1) appears to be on the graph of $x - 2y = 8$. You can check this algebraically.

$x - 2y = 8$	Write original equation.
$10 - 2(1) \stackrel{?}{=} 8$	Substitute 10 for x and 1 for y.
$8 = 8$	Simplify. True statement

(10, 1) is a solution of the equation $x - 2y = 8$, so it is on the graph.

Exercises for Example 1

Decide whether the given ordered pair is a solution of the equation.

1. $-3x + 6y = 12, (-4, 0)$

2. $x + 5y = 11, (2, 1)$

3. $y = 1, (3, 1)$

4. $3y - 5x = 4, (-2, 2)$

Chapter 4

LESSON **4.2** CONTINUED

NAME ______________________ DATE __________

Practice with Examples

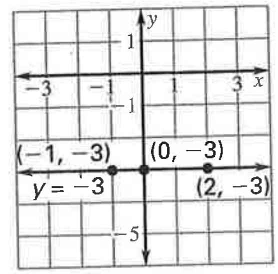
For use with pages 210–217

EXAMPLE 3 *Graphing $y = b$*

Graph the equation $y = -3$.

SOLUTION

The y-value is always -3, regardless of the value of x. The points $(-1, -3)$, $(0, -3)$, $(2, -3)$ are some solutions of the equation. The graph of the equation is a horizontal line 3 units below the x-axis.

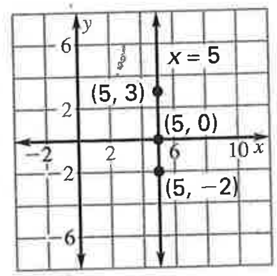


EXAMPLE 4 *Graphing $x = a$*

Graph the equation $x = 5$.

SOLUTION

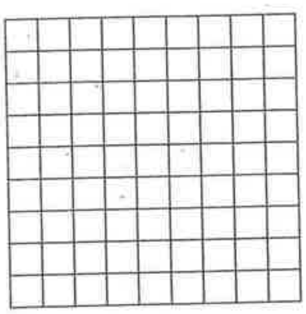
The x-value is always 5, regardless of the value of y. The points $(5, -2)$, $(5, 0)$, $(5, 3)$ are some solutions of the equation. The graph of the equation is a vertical line 5 units to the right of the y-axis.



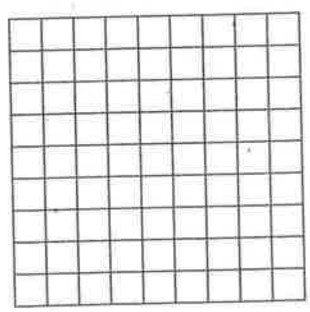
Exercises for Examples 3 and 4

Graph the equation.

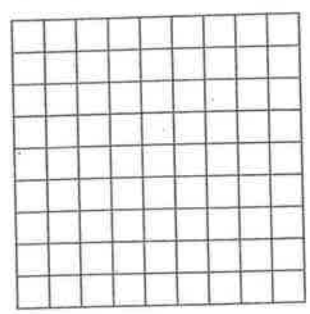
8. $y = 0$



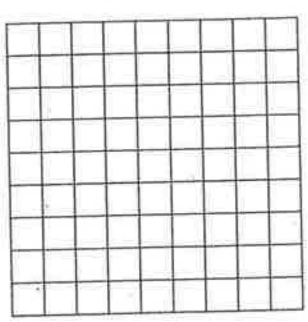
9. $x = -4$



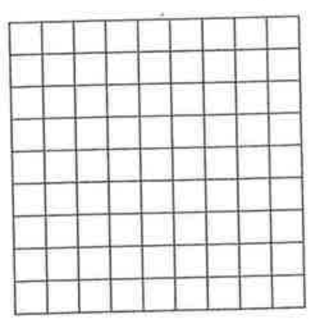
10. $x = 0$



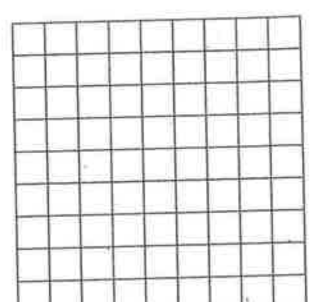
11. $y = 6$



12. $y = -5$



13. $x = 2$



Chapter 4

LESSON 4.3

NAME ______________________ DATE ________

Practice with Examples

For use with pages 218–224

GOAL **Find the intercepts of the graph of a linear equation and use the intercepts to sketch a quick graph of a linear equation**

VOCABULARY

An **x-intercept** is the x-coordinate of a point where a graph crosses the x-axis. The y-coordinate of this point is 0.

A **y-intercept** is the y-coordinate of a point where a graph crosses the y-axis. The x-coordinate of this point is 0.

EXAMPLE 1 *Finding Intercepts*

Find the x-intercept and the y-intercept of the graph of the equation $4x - 2y = 8$.

SOLUTION

To find the x-intercept of $4x - 2y = 8$, let $y = 0$.

$4x - 2y = 8$	Write original equation.
$4x - 2(0) = 8$	Substitute 0 for y.
$x = 2$	Solve for x.

The x-intercept is 2. The line crosses the x-axis at the point $(2, 0)$.

To find the y-intercept of $4x - 2y = 8$, let $x = 0$.

$4x - 2y = 8$	Write original equation.
$4(0) - 2y = 8$	Substitute 0 for x.
$y = -4$	Solve for y.

The y-intercept is -4. The line crosses the y-axis at the point $(0, -4)$.

NAME ______________________ DATE __________

Practice with Examples

For use with pages 218–224

Exercises for Example 1

Find the x-intercept of the graph of the equation.

1. $x - y = 6$

2. $-2x + y = -4$

3. $3x - 2y = 6$

Find the y-intercept of the graph of the equation.

4. $x - y = 6$

5. $-2x + y = -4$

6. $3x - 2y = 6$

EXAMPLE 2 Making a Quick Graph

Graph the equation $2x - y = 8$.

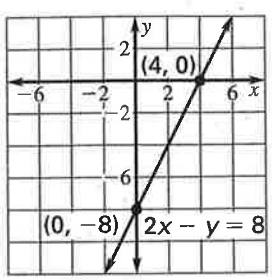
SOLUTION

Find the intercepts by first substituting 0 for y and then substituting 0 for x.

$$\begin{aligned} 2x - y &= 8 \\ 2x - 0 &= 8 \\ 2x &= 8 \\ x &= 4 \end{aligned} \qquad\qquad \begin{aligned} 2x - y &= 8 \\ 2(0) - y &= 8 \\ -y &= 8 \\ y &= -8 \end{aligned}$$

The x-intercept is 4. The y-intercept is -8.

Draw a coordinate plane that includes the points $(4, 0)$ and $(0, -8)$. Plot the points $(4, 0)$ and $(0, -8)$ and draw a line through them. The graph is shown below.



LESSON 4.4

NAME ______________________ DATE ________

Practice with Examples

For use with pages 226–233

GOAL **Find the slope of a line using two of its points and how to interpret slope as a rate of change in real-life situations**

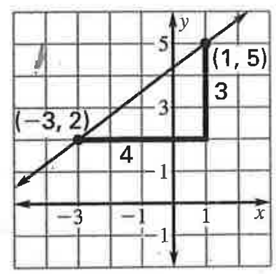
VOCABULARY

The **slope** m of a nonvertical line is the number of units the line rises or falls for each unit of horizontal change from left to right.

A **rate of change** compares two different quantities that are changing.

EXAMPLE 1 *Finding the Slope of a Line*

Find the slope of the line passing through $(-3, 2)$ and $(1, 5)$.



SOLUTION

Let $(x_1, y_1) = (-3, 2)$ and $(x_2, y_2) = (1, 5)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \begin{array}{l}\leftarrow \text{ Rise: Difference of } y\text{-values}\\ \leftarrow \text{ Run: Difference of } x\text{-values}\end{array}$$

$$= \frac{5 - 2}{1 - (-3)} \qquad \text{Substitute values.}$$

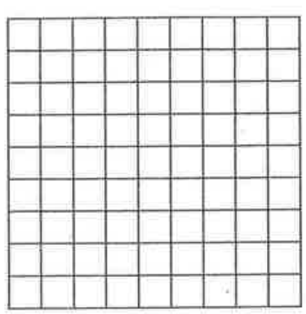
$$= \frac{3}{1 + 3} = \frac{3}{4} \qquad \text{Simplify. Slope is positive.}$$

Because the slope in Example 1 is positive, the line rises from left to right. If a line has negative slope, then the line falls from left to right.

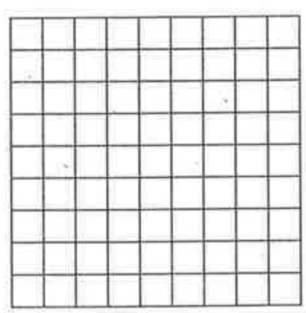
Exercises for Example 1

Plot the points and find the slope of the line passing through them.

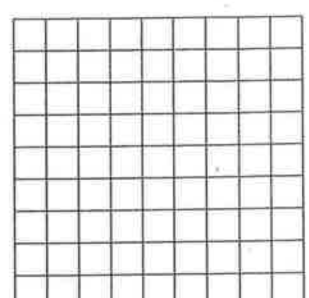
1. $(-4, 0), (3, 3)$



2. $(-1, -2), (2, -6)$



3. $(-3, -1), (1, 3)$



Chapter 4

LESSON 4.6

NAME ______________________________ DATE __________

Practice with Examples

For use with pages 241–247

GOAL Graph a linear equation in slope-intercept form and interpret equations in slope-intercept form

VOCABULARY

The linear equation $y = mx + b$ is written in **slope-intercept form.** The slope of the line is m. The y-intercept is b.

Two different lines in the same plane are **parallel** if they do not intersect. Any two nonvertical lines are parallel if and only if they have the same slope (all vertical lines are parallel).

EXAMPLE 1 *Writing Equations in Slope-Intercept Form*

	EQUATION	SLOPE-INTERCEPT FORM	SLOPE	y-INTERCEPT
a.	$y = 3x$	$y = 3x + 0$	$m = 3$	$b = 0$
b.	$y = \dfrac{2x - 3}{5}$	$y = \dfrac{2}{5}x - \dfrac{3}{5}$	$m = \dfrac{2}{5}$	$b = -\dfrac{3}{5}$
c.	$4x + 8y = 24$	$y = -0.5x + 3$	$m = -0.5$	$b = 3$

Exercises for Example 1

Write the equation in slope-intercept form. Find the slope and the y-intercept

1. $y = -3x$

2. $x + y - 5 = 0$

3. $3x + y = 5$

4. $y = \dfrac{-x + 7}{3}$

5. $y = 2$

6. $x + 4y - 4 = 0$

7. Which two lines in Exercises 1–6 are parallel? Explain.

Chapter 4

NAME ______________________ DATE __________

Practice with Examples

For use with pages 279–284

EXAMPLE 2 Writing Equations of Parallel Lines

Write an equation of the line that is parallel to the line $y = 2x + 1$ and passes through the point $(1, 5)$.

SOLUTION

The given line has a slope of $m = 2$. A parallel line through $(1, 5)$ must also have a slope of $m = 2$. Use this information to find the y-intercept.

$y = mx + b$	Write slope-intercept form.
$5 = 2(1) + b$	Substitute 2 for m, 1 for x, and 5 for y.
$5 = 2 + b$	Simplify.
$3 = b$	Solve for b.

The y-intercept is $b = 3$.

Write an equation using the slope-intercept form.

$y = mx + b$	Write slope-intercept form.
$y = 2x + 3$	Substitute 2 for m and 3 for b.

Exercises for Example 2

Write an equation of the line that is parallel to the given line and passes through the given point.

4. $y = 4x - 1,\ (2, 3)$

5. $y = x + 6,\ (-3, 0)$

6. $y = -2x + 3,\ (1, -1)$

Chapter 5

LESSON 5.3

NAME ______________________ DATE __________

Practice with Examples

For use with pages 285–291

GOAL **Write an equation of a line given two points on the line and use a linear equation to model a real-life problem**

> **VOCABULARY**
>
> Two different nonvertical lines are **perpendicular** if and only if their slopes are negative reciprocals of each other.

EXAMPLE 1 *Writing an Equation Given Two Points*

Write an equation of the line that passes through the points (1, 5) and (2, 3).

SOLUTION

Find the slope of the line. Let $(x_1, y_1) = (1, 5)$ and $(x_2, y_2) = (2, 3)$.

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$	Write formula for slope.
$= \dfrac{3 - 5}{2 - 1}$	Substitute.
$= \dfrac{-2}{1} = -2$	Simplify.

Find the y-intercept. Let $m = -2$, $x = 1$, and $y = 5$ and solve for b.

$y = mx + b$	Write slope-intercept form.
$5 = (-2)(1) + b$	Substitute -2 for m, 1 for x, and 5 for y.
$5 = -2 + b$	Simplify.
$7 = b$	Solve for b.

Write an equation of the line.

$y = mx + b$	Write slope-intercept form.
$y = -2x + 7$	Substitute -2 for m and 7 for b.

NAME ______________________ DATE ________

Practice with Examples

For use with pages 285–291

Exercises for Example 1

Write an equation in slope-intercept form of the line that passes through the points.

1. (4, 9) and (1, 6)

2. (0,7) and (1, −1)

3. (−2, −3) and (0, 3)

EXAMPLE 2 Writing Equations of Perpendicular Lines

Write an equation of the line that is perpendicular to the line $y = -3x + 2$ and passes through the point (6, 5).

SOLUTION

The given line has a slope of $m = -3$. A perpendicular line through (6, 5) must have a slope of $m = \frac{1}{3}$. Use this information to find the y-intercept.

$y = mx + b$	Write slope-intercept form.
$5 = \frac{1}{3}(6) + b$	Substitute $\frac{1}{3}$ for m, 6 for x, and 5 for y.
$5 = 2 + b$	Simplify.
$3 = b$	Solve for b.

The y-intercept is $b = 3$.

Write an equation using the slope-intercept form.

$y = mx + b$	Write slope-intercept form.
$y = \frac{1}{3}x + 3$	Substitute $\frac{1}{3}$ for m and 3 for b.

LESSON 5.6 CONTINUED

NAME ______________________ DATE __________

Practice with Examples

For use with pages 308–314

EXAMPLE 2 Writing a Linear Equation

Write the standard form of the equation passing through (3, 7) with a slope of 2.

SOLUTION

Write the point-slope form of the equation of the line.

$y - y_1 = m(x - x_1)$	Write point-slope form.
$y - 7 = 2(x - 3)$	Substitute for y_1, m, and x_1.
$y - 7 = 2x - 6$	Use distributive property.
$-2x + y = 1$	Add $-2x$ and 7 to each side.

Exercises for Example 2

Write the standard form of the equation of the line that passes through the given point and has the given slope.

4. $(1, 4)$, $m = -2$

5. $(-3, 1)$, $m = 3$

6. $(5, -2)$, $m = -1$

LESSON **6.5** CONTINUED

NAME ______________________ DATE ________

Practice with Examples

For use with pages 360–366

EXAMPLE 2 Graphing a Linear Inequality in Two Variables

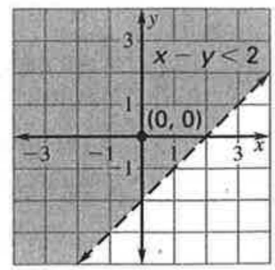
Sketch the graph of $x - y < 2$.

SOLUTION

The corresponding equation is $x - y = 2$. To graph this line, first write the equation in slope-intercept form: $y = x - 2$.

Graph the line that has a slope of 1 and a y-intercept of -2. Use a dashed line to show that the points on the line are not solutions.

The origin $(0, 0)$ is a solution and it lies above the line. So, the graph of $x - y < 2$ is all points above the line $y = x - 2$.



Exercises for Example 2

Sketch the graph of the inequality.

3. $x \le 2$

4. $y > -1$

5. $y - x < 3$

6. $2x + y \ge 4$

Chapter 6

LESSON 8.1

NAME ______________________ DATE __________

Practice with Examples

For use with pages 450–455

GOAL **Use properties of exponents to multiply exponential expressions and use powers to model real-life problems**

VOCABULARY

Let a and b be numbers and let m and n be positive integers.

Product of Powers Property
To multiply powers having the same base, add the exponents.
$a^m \cdot a^n = a^{m+n}$ Example: $3^2 \cdot 3^7 = 3^{2+7} = 3^9$

Power of a Power Property
To find a power of a power, multiply the exponents.
$(a^m)^n = a^{m \cdot n}$ Example: $(5^2)^4 = 5^{2 \cdot 4} = 5^8$

Power of a Product Property
To find a power of a product, find the power of each factor and multiply.
$(a \cdot b)^m = a^m \cdot b^m$ Example: $(2 \cdot 3)^6 = 2^6 \cdot 3^6$

EXAMPLE 1 *Using the Product of Powers Property*

a. $4^3 \cdot 4^5$

b. $(-x)(-x)^2$

SOLUTION

To multiply powers having the same base, add the exponents.

a. $4^3 \cdot 4^5 = 4^{3+5}$
$= 4^8$

b. $(-x)(-x)^2 = (-x)^1(-x)^2$
$= (-x)^{1+2}$
$= (-x)^3$

Exercises for Example 1

Use the product of powers property to simplify the expression.

1. $m \cdot m$

2. $6^2 \cdot 6^3$

3. $y^4 \cdot y^3$

4. $3 \cdot 3^5$

Chapter 8

NAME ______________________ DATE __________

Practice with Examples

For use with pages 450–455

EXAMPLE 2 Using the Power of a Power Property

a. $(z^4)^5$

b. $(2^3)^2$

SOLUTION

To find a power of a power, multiply the exponents.

a. $(z^4)^5 = z^{4 \cdot 5}$
$= z^{20}$

b. $(2^3)^2 = 2^{3 \cdot 2}$
$= 2^6$

Exercises for Example 2

Use the power of a power property to simplify the expression.

5. $(w^7)^3$

6. $(7^3)^5$

7. $(t^2)^6$

8. $[(-2)^3]^2$

EXAMPLE 3 Using the Power of a Product Property

Simplify $(-4mn)^2$.

SOLUTION

To find a power of a product, find the power of each factor and multiply.

$(-4mn)^2$	$= (-4 \cdot m \cdot n)^2$	Identify factors.
	$= (-4)^2 \cdot m^2 \cdot n^2$	Raise each factor to a power.
	$= 16m^2n^2$	Simplify.

LESSON 8.1 CONTINUED

NAME ______________________ DATE ________

Practice with Examples

For use with pages 450–455

Exercises for Example 3

Use the power of a product property to simplify the expression.

9. $(5x)^3$

10. $(10s)^2$

11. $(-x)^4$

12. $(-3y)^3$

EXAMPLE 4 Using Powers to Model Real-Life Problems

You are planting two square vegetable gardens. The side of the larger garden is twice as long as the side of the smaller garden. Find the ratio of the area of the larger garden to the area of the smaller garden.

SOLUTION

$$\text{Ratio} = \frac{(2x)^2}{x^2} = \frac{2^2 \cdot x^2}{x^2} = \frac{4x^2}{x^2} = \frac{4}{1}$$

Exercise for Example 4

13. Rework Example 4 if the side of the larger garden is three times as long as the side of the smaller garden.

Chapter 8

NAME ______________________ DATE ________

Practice with Examples

For use with pages 456–461

EXAMPLE 2 Simplifying Exponential Expressions

Rewrite the expression with positive exponents.

a. $5y^{-1}z^{-2}$ **b.** $(2x)^{-3}$

SOLUTION

a. $5y^{-1}z^{-2} = 5 \cdot \frac{1}{y} \cdot \frac{1}{z^2} = \frac{5}{yz^2}$

b. $(2x)^{-3} = 2^{-3} \cdot x^{-3}$ Use power of a product property.

$= \frac{1}{2^3} \cdot \frac{1}{x^3}$ Write reciprocals of 2^3 and x^3.

$= \frac{1}{8x^3}$ Multiply fractions.

Exercises for Example 2

Rewrite the expression with positive exponents.

4. $(13y)^{-1}$ **5.** $\frac{1}{(2x)^{-4}}$ **6.** $(2c)^{-4}d$

EXAMPLE 3 Evaluating Exponential Expressions

Evaluate the expression.

$(3^{-2})^{-3}$

SOLUTION

$(3^{-2})^{-3} = 3^{-2\cdot(-3)}$ Use power of a power property.

$= 3^6$ Multiply exponents.

$= 729$ Evaluate.

Exercises for Example 3

Evaluate the expression.

7. $8^{-1} \cdot 8^1$ **8.** $4^6 \cdot 4^{-4}$ **9.** $(5^{-2})^2$

Chapter 8

LESSON 8.3

NAME ______________________ DATE ______

Practice with Examples

For use with pages 463–469

GOAL **Use the division properties of exponents to evaluate powers and simplify expressions, and use the division properties of exponents to find a probability**

VOCABULARY

Let a and b be numbers and let m and n be integers.

Quotient of Powers Property

To divide powers having the same base, subtract exponents.

$\frac{a^m}{a^n} = a^{m-n}$, $a \neq 0$ Example: $\frac{3^7}{3^5} = 3^{7-5} = 3^2$

Power of a Quotient Property

To find a power of a quotient, find the power of the numerator and the power of the denominator and divide.

$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$, $b \neq 0$ Example: $\left(\frac{4}{5}\right)^3 = \frac{4^3}{5^3}$

EXAMPLE 1 *Using the Quotient of Powers Property*

Use the quotient of powers property to simplify the expression.

a. $\frac{8^2 \cdot 8^4}{8^3}$ **b.** $z^7 \cdot \frac{1}{z^8}$

SOLUTION

To divide powers having the same base, subtract exponents.

a. $\frac{8^2 \cdot 8^4}{8^3} = \frac{8^6}{8^3}$

$= 8^{6-3}$

$= 8^3$

b. $z^7 \cdot \frac{1}{z^8} = \frac{z^7}{z^8}$

$= z^{7-8}$

$= z^{-1}$

$= \frac{1}{z}$

Exercises for Example 1

Use the quotient of powers property to simplify the expression.

1. $\frac{10^4}{10}$ **2.** $\frac{3^2}{3^3}$ **3.** $\frac{1}{y^2} \cdot y^8$

Chapter 8

NAME ______________________ DATE ________

Practice with Examples

For use with pages 463–469

EXAMPLE 2 Simplifying an Expression

Simplify the expression. $\left(\frac{7a}{b^2}\right)^3$

SOLUTION

$\left(\frac{7a}{b^2}\right)^3 = \frac{(7a)^3}{(b^2)^3}$ Power of a quotient

$= \frac{7^3 \cdot a^3}{b^6}$ Power of a product and power of a power

$= \frac{343a^3}{b^6}$ Simplify.

Exercises for Example 2

Simplify the expression. The simplified expression should have no negative exponents.

4. $\left(\frac{2}{x^3}\right)^4$

5. $\frac{z \cdot z^5}{z^2}$

6. $\left(\frac{5y^2}{w}\right)^2$

LESSON 8.4

NAME ______________________________ DATE ________

Practice with Examples

For use with pages 470–475

GOAL **Use scientific notation to represent numbers and to describe real-life situations**

VOCABULARY

A number is written in **scientific notation** if it is of the form $c \times 10^n$, where $1 \le c < 10$ and n is an integer.

EXAMPLE 1 *Rewriting in Decimal Form*

Rewrite each number in decimal form.

a. 2.23×10^4

b. 8.5×10^{-3}

SOLUTION

a. $2.23 \times 10^4 = 22{,}300$ Move decimal point right 4 places.

b. $8.5 \times 10^{-3} = 0.0085$ Move decimal point left 3 places.

Exercises for Example 1

Rewrite each number in decimal form.

1. 9.332×10^6

2. 2.78×10^{-1}

3. 4.5×10^5

Chapter 8

NAME ______________________________ DATE ____________

Practice with Examples

For use with pages 470–475

EXAMPLE 2 Rewriting in Scientific Notation

Rewrite each number in scientific notation.

a. 0.0729

b. 26,645

SOLUTION

a. $0.0729 = 7.29 \times 10^{-2}$ Move decimal point right 2 places.

b. $26{,}645 = 2.6645 \times 10^4$ Move decimal point left 4 places.

Exercises for Example 2

Rewrite each number in scientific notation.

4. 75.2

5. 135,667

6. 0.00088

EXAMPLE 3 Computing with Scientific Notation

Evaluate the expression and write the result in scientific notation.

$(7.0 \times 10^4)^2$

SOLUTION

To multiply, divide, or find powers of numbers in scientific notation, use the properties of exponents.

$(7.0 \times 10^4)^2 = 7.0^2 \times (10^4)^2$ Power of a product

$= 49 \times 10^8$ Power of a power

$= 4.9 \times 10^9$ Write in scientific notation.

Exercises for Example 3

Evaluate the expression and write the result in scientific notation.

7. $(2.3 \times 10^{-1})(5.5 \times 10^3)$

8. $(2.0 \times 10^{-1})^3$

LESSON 9.2

NAME ______________________ DATE ____________

Practice with Examples

For use with pages 511–516

GOAL **Use properties of radicals to simplify radicals and use quadratic equations to model real-life problems**

VOCABULARY

Product Property The square root of a product equals the product of the square roots of the factors.

$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ when a and b are positive numbers

Quotient Property The square root of a quotient equals the quotient of the square roots of the numerator and denominator.

$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ when a and b are positive numbers

An expression with radicals is in **simplest form** if the following are true:

- No perfect square factors other than 1 are in the radicand.
- No fractions are in the radicand.
- No radicals appear in the denominator of a fraction.

EXAMPLE 1 *Simplifying with the Product Property*

Simplify the expression $\sqrt{147}$.

SOLUTION

You can use the product property to simplify a radical by removing perfect square factors from the radicand.

$\sqrt{147} = \sqrt{49 \cdot 3}$	Factor using perfect square factor.
$= \sqrt{49} \cdot \sqrt{3}$	Use product property.
$= 7\sqrt{3}$	Simplify.

Exercises for Example 1

Simplify the expression.

1. $\sqrt{98}$

2. $\sqrt{52}$

3. $\sqrt{300}$

4. $\sqrt{99}$

Chapter 9

LESSON
9.2
CONTINUED

NAME ______________________ DATE __________

Practice with Examples

For use with pages 511–516

EXAMPLE 2 Simplifying with the Quotient Property

Simplify the expression $\frac{\sqrt{63}}{6}$.

SOLUTION

$\frac{\sqrt{63}}{6} = \frac{\sqrt{9 \cdot 7}}{6}$ Factor using perfect square factor.

$= \frac{3\sqrt{7}}{6}$ Remove perfect square factor.

$= \frac{\sqrt{7}}{2}$ Divide out common factors.

Exercises for Example 2

Simplify the expression.

5. $\sqrt{\frac{11}{4}}$

6. $\frac{\sqrt{200}}{60}$

7. $\sqrt{\frac{5}{9}}$

8. $\frac{\sqrt{75}}{20}$

Chapter 9

NAME ______________________________ DATE __________

Practice with Examples

For use with pages 625–632

GOAL **Use the distributive property to factor a polynomial and solve polynomial equations by factoring**

VOCABULARY

A factor is **prime** if it cannot be factored using integer coefficients.

To **factor a polynomial completely,** write it as the product of monomial factors and prime factors with at least two terms.

EXAMPLE 1 *Finding the Greatest Common Factor*

Factor the greatest common factor out of $35x^3 + 45x^5$.

SOLUTION

First find the greatest common factor (GCF). It is the product of all the common factors.

$$35x^3 = 5 \cdot 7 \cdot x \cdot x \cdot x$$

$$45x^5 = 5 \cdot 9 \cdot x \cdot x \cdot x \cdot x \cdot x$$

$$\text{GCF} = 5 \cdot x \cdot x \cdot x = 5x^3$$

Use the distributive property to factor the greatest common factor out of the polynomial.

$$35x^3 + 45x^5 = 5x^3(7 + 9x^2)$$

Exercises for Example 1

Find the greatest common factor and factor it out of the expression.

1. $24y^3 + 32y$

2. $6n^8 - 18n^3$

3. $3a^2 + 30$

LESSON 11.2

NAME ______________________________ DATE __________

Practice with Examples

For use with pages 649–655

GOAL **Use equations to solve percent equations and use percents in real-life problems**

> **VOCABULARY**
>
> In any percent equation the **base number** is the number that you are comparing to.

Chapter 11

EXAMPLE 1 *Number Compared to Base is Unknown*

What is 40% of 65 meters?

SOLUTION

VERBAL MODEL $\boxed{a}$ is $\boxed{p \text{ percent}}$ of $\boxed{b}$

LABELS

Number compared to base = a (meters)

Percent = 40% = 0.40 (no units)

Base Number = 65 (meters)

ALGEBRAIC MODEL

$a = (0.40)(65)$

$a = 26$ 26 meters is 40% of 65 meters.

Exercises for Example 1

1. What is 24% of $30?

2. What is 60% of 15 miles?

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Practice with Examples

For use with pages 649–655

EXAMPLE 2 Base Number is Unknown

Twenty-five miles is 20% of what distance?

SOLUTION

VERBAL MODEL $\boxed{a}$ is $\boxed{p \text{ percent}}$ of $\boxed{b}$

LABELS

Number compared to base = 25 (miles)

Percent = 20% = 0.20 (no units)

Base Number = b (miles)

ALGEBRAIC MODEL

$25 = (0.20)b$

$\frac{25}{0.20} = 125 = b$ Twenty-five miles is 20% of 125 miles.

Exercises for Example 2

3. Sixty grams is 40% of what weight?

4. Fifteen yards is 30% of what distance?

EXAMPLE 3 Percent is Unknown

Ninety is what percent of 15?

SOLUTION

VERBAL MODEL $\boxed{a}$ is $\boxed{p \text{ percent}}$ of $\boxed{b}$

LABELS

Number compared to base = 90 (no units)

Percent = p (no units)

Base Number = 15 (no units)

ALGEBRAIC MODEL

$90 = p(15)$

$\frac{90}{15} = p$

$6 = p$ Decimal form

$600\% = p$ Decimal form $\left(6 = \frac{600}{100}\right)$

LESSON 11.2 CONTINUED

NAME ______________________ DATE ________

Practice with Examples

For use with pages 649–655

Exercises for Example 3

5. Forty-five is what percent of 180?

6. Sixty is what percent of 15?

EXAMPLE 4 *Modeling and Using Percents*

You took a multiple-choice exam with 200 questions. You answered 80% of the questions correctly. How many questions did you answer correctly?

SOLUTION

You can solve the problem by using a proportion. Let n represent the number of correct answers.

$\dfrac{\textit{Number of correct answers}}{\textit{Total number of answers}} = \dfrac{80}{100}$	Write proportion.
$\dfrac{n}{200} = \dfrac{80}{100}$	Substitute.
$100n = 200 \cdot 80$	Use cross products.
$n = \dfrac{200 \cdot 80}{100}$	Divide by 100.
$n = 160$	Simplify.

You answered 160 questions correctly.

Exercise for Example 4

7. Rework Example 4 if you answered 85% of the questions correctly.